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Next 2 Page(s) In Document Denied

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SIX YEARS OF THE UPPER SILESIAN INDUSTRIAL DISTRICT COMMITTEE

BY

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The Upper Silesian Industrial District (Górnośląski Okręg Przemysłowy, GOP) is of paramount importance in the industrial life of Poland. It accounts for one-fourth of total industrial output and 26% of industrial employment, providing work for 700 thousand workers. It supplies three-quarters of total coal production, two-thirds of metallurgical goods, half the electric power output, and 90% of zinc production. In this region are concentrated numbers of large plants of the metallurgical, engineering, chemical, building material, and other industries, and outgoing consignments account for almost half of Poland's total goods traffic. The region is very small, covering an area of roughly 2050 sq. km. right in the centre of Katowice voivodship (0.65% of Poland's total area), but is populated by nearly two million people (some 7% of the national total), attaining a density of over 900 inhabitants per square kilometre, as compared to the average of 325 for the voivodship as a whole, and the national average of 90. GOP is among Europe's largest industrial centres. Its characteristic features are an unusually high concentration of extractive and processing industries and of the congestion of population employed in an uncommonly small area. With this is associated extraordinary concentration of urban settlements (conurbation), a dense network of roads and railways, as well as of variety of services and public utilities.

GOP, however, has its own peculiarities which differentiate it from other similar centres of black metallurgy, but also create certain difficulties, and even contradictions, success in solving which will determine its further development, and, consequently, the development also of the rest of the country. Paramount here are certain issues connected with the space economy and regional planning, as enumerated below.

1. There are major conflicts between the development of mining and that of the processing industries, services and settlement. These are expressed in the blocking of valuable raw materials by expanding surface investments which must be protected, or in the restriction of opportunities for settling and for developing processing industries in favour of unrestricted exploitation of mineral resources.

2. There are difficulties in meeting the constantly growing demand for industrial and household water in the region, which lies in the neighbourhood of the watershed between the basins of the rivers Vistula and Odra. Further difficulties are entailed by the need for disposal of large volumes of excessively polluted waste waters from a vast and congested industrial and urban centre.

3 The developing mining and heavy industries have severly ravaged the natural environment. Forests have been cut down, the system of surface and underground water bodies upset, and every year adds more and more industrial wasteland in the form of metallurgical and mining waste heaps and the like. The area of stone quarries, old sand pits and exploited works increases annually. Hundreds of factory stacks pollute the air with fumes in concentrations not met with in other industrial areas. Industry grows and develops, deteriorating more and more the local living conditions.

4. Worked out coal pits, inadequately reinforced, cause bumps and caving with extensive mining damage on the surface to buildings, transmission and communication lines and various utilities. The conflict between expanding towns and the ramifying tunnels of mines grows more and more acute.

5. Transportation troubles are increasing. The network of standard and narrow-gauge railways, tramways and roads is extraordinarily dense and yet unable to meet the traffic requirements of industry and population.

6. Increasing population and rising living standards engender serious difficulties in the supply of food, which comes from outside the GOP, especially dairy products, vegetables, fruit, meat, etc.

7. Over one hundred years of extremely erratic economic development under the capitalist system has left in GOP a legacy of chaos in spatial development, expressed in, among other things, a bewildering confusion of housing and industrial buildings, a vexing maze of communication lines, a scarcity of green areas, and an erroneous urban structure.

The need for, on the one hand, rapid further development of Silesia's industrial production, and, on the other, the difficulties referred to, which are rooted in the conflicting interests of various sectors of socio-economic life crowded on a small area, demanded rational directing for further development, based on correct use of space and fitting into the fundamental pattern of the regional plan. In this connection, the office of the GOP Regional Plan was set up in Katowice in 1951. The office engaged in studies on development principles and the draft of a 1955–70 plan of GOP spatial evolution.

Owing to differentiation in the region concerned, it has been divided into area "A", covering the most industrialized central conurbation, and the encompassing zone "B", less industrialized but intimately linked with the former. The studies of 1951—1953 strikingly demonstrated the need for industry and housing to be "deglomeration" in area "A", and for emphasis in further investments, especially housing projects, to be shifted to Zone "B". On June 6, 1953, the draft of the GOP regional plan was endorsed by the Presidium of the Council of Ministers as the first phase of the plan. To assist further studies and preparation of the second and final phase of the plan, the Presidium obliged various government departments, and also the Polish Academy of Sciences, to work out a number of specific problems, and defined in detail in a resolution dated December 12, 1954, the postulates advanced earlier in a more general form.

The GOP regional plan is designed to create suitable conditions for full development of the productive forces of the region by, among other things, restricting the development of industrial establishments not connected with the local raw material resources, step-by-step translocation of some fifty of such plants already in existence, and improvement of living conditions. Mining and industrial development indices have been defined, and blueprints prepared for plans connected with exploitation of sand, utilization or development of industrial waste lands, especially waste heaps, streamlining of communications, intensification of agriculture, re-afforestation, laying out of parks and green areas in general, improvement of water supply, better purification of waste waters and air, improved housing conditions, and relieving the congestion of public utilities and cultural facilities serving the region's growing population.

By the end of 1956 the ministries concerned and the Academy were to deliver to the GOP Regional Plan office the results of their studies, which would provide material for the second phase of the draft Plan.

The Academy was to deal with the following aspects: 1) technical progress and mechanization as a way to reducing the labour force, water consumption and floor space occupied by industrial planes; 2) problems associated with the movements of rock masses overlying mines, 3) intensification of agriculture; 4) GOP local climate; 5) development and utilization of industrial waste lands; and 6) improvement and co-ordination of transport.

With this in view, the Academy appointed a commission, first under the Technical Sciences Section, than, in view of the wide range of research subjects which involved several sections, directly under the Academy Board. In 1956, the commission was converted into a special intersectional Committee on the Upper Silesian Industrial District. Under the chairmanship of Professor Stanislaw Leszczycki, the Committee carried on its work

mainly in eight commissions concerned with the following subjects: 1) climate; 2) water management and prevention of water pollution; 3) biological development of industrial waste lands (the commission was subsequently transformed into one on soil science and mining); 4) agriculture; 5) utilization of waste heaps; 6) mechanics of rock masses; 7) building (this commission emerged from that on mechanics of rock masses); and 8) technical purification of atmosphere.

Furthermore, three working groups were appointed to work on: 1) communication and transport; 2) geomorphology and hydrography, and 3) the Częstochowa Industrial District.

The Committee's work covered issues of the utmost importance for improvement of living conditions, investing, and several production side-lines (e. g., utilization of waste heaps). It has not been concerned with fundamental mining and metallurgical production, production economics, basic principles of town planning, nor with demographic, sociology and such-like aspects; this clearly shows the commissioned character of the research, which was essentially intended to supply the GOP Regional Plan Office with data for the final draft of the spatial development plan. The Committee's objects were plainly defined, and the research was to last two years. To make even preliminary results immediately available, the Committee launched in 1955 a mimeographed *Bulletin*, which evoked interest both in the country and abroad. Several issues have been translated into foreign languages and reprinted.

However, there have been certain changes in the organization of regional planning. The Office was transformed, and attached to the Voivodship Economic Planning Commission within which there was subsequently set up a Long Range Plans Department. The Department engaged in work on guidelines for the economic development of the voivodship, which provided a broad background for ideas on the spatial evolution of GOP itself. Thus, the Academy Committee lost the main recipient of research results, and, on the other hand, had to adapt the scope of its work to that of the Voivodship Economic Planning Commission. Consequently, it strove to cover regions outside GOP (zones A and B), extending research to such major areas as, primarily, the Częstochowa Industrial District, next, the Rybnik Coal Basin, and, recently, the Zawiercie-Myszków Subarea.

The work of particular commissions and working groups also developed along a variety of lines. For instance, the Committee has not managed to appoint working groups for questions of technical progress and mechanization, which were to conduct research on reducing the employment, water consumption and floor space in industrial establishments. On the other hand, the commissions and working groups already mentioned concentrated over two hundred scientific workers from Warsaw, Cracow and Silesia, and enlisted the co-operation of dozens of Academy and Government research centres, as well as of Silesian, Cracow and Warsaw university school

departments. Individual working groups differed as to their activity. Consequently, varying results have been obtained in the particular fields, though on the whole such results have been substantial, to judge even from the 33 volumes alone of the Committee's *Bulletin*, which make up 5000 pages and record what has been done over this period.

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The Committee's most important contributions have been in such matters as: GOP local climate, air pollution, utilizations of industrial waste land and wastes, water management, intensification of agriculture, mining damage, and relation between climate and air pollution.

Local climate and air pollution

The Commission on Climatic Questions began with detailed studies on the peculiarities of the GOP local climate. Before 1954, the region had only two meteorological stations, in Katowice and Bytom; today, as a result of the Committee's initiative, the State Hydro-Meteorological Institute's network operates there eight such stations with regional headquarters in Siemianowice. In local climatic studies, attention has been focused primarily on the noxious effects of air pollution on, among other things, insolation. Dust released into the atmosphere by industrial plants and households attains the vast annual total of one million tons. Thus, an average of one ton settles daily per square kilometre; but there are regions (e.g., Chrzanów) where that figure is as much as 14 tons, and days when it increases to 45 tons. Measurements have shown that pollution with gaseous products, mainly sulphur dioxide (SO_2), in places far exceeds the limits considered safe for health. Studies over the deleterious effects of dusts from the Szopienice zinc plant are being conducted by the Katowice Sanitary and Epidemiological Station.

Since distribution of the pollution depends largely on weather and wind, detailed data have been compiled concerning the variability and frequency of particular types of weather, together with the velocity and direction of high winds. To devise means of air pollution control, a separate Commission on Technical Air Purification has been appointed.

By way of detailed quantitative studies, this Commission was able to identify the chief culprits of air pollution and found their contributions to be: industrial boiler plants — 26%; iron and non-ferrous metallurgy — 24%; power plants — 19%; households — 12%; chemical industry — 4%; building materials industry — 3% etc. Over several years of research a practicable programme has been compiled and there is reason to expect improvement in the near future.

Furthermore, the Commission is engaged in theoretical research on the structure of dusts, on basic theoretical aspects involved in designing equipment for dust elimination, and on the losses inflicted by dusts on the national economy.

Utilization of industrial waste lands and wastes

The Commission on Biological Development of Industrial Waste Lands made a list of all such waste lands in the GOP. The list includes some 2000 waste heaps which make up over 150 million cubic metres and add to themselves a further 20 million cu. m every year, rough land over collapsed mines, exhausted sand pits and quarries, a variety of subsided ground etc. In addition to various *ad hoc* practical development measures of particular groups of waste land, the Commission has also conducted long-range studies on ways of reclaiming these waste lands. Thus it was reorganized as Commission on Soil Science and Mining, with emphasis on soil science. A 1 : 50 000 soil map has been prepared for the region, together with a new classification of soils destroyed by dust, smoke and unconsidered human activities. The Commission is now running an extensive scheme of turning waste land into green areas and is keeping such under close surveillance.

The Commission on Utilization of Waste Heaps is studying re-utilization of industrial wastes. It has listed and classified heaps, registered and co-ordinated work on using them, started new research, and solved a number of questions in waste heaps utilization. It worked out methods of granulating slag for the production of slag cement and plastic cement as an additive to sand for hydraulic back-filling, for the production of artificial pumice, use of acid blast-furnace slag as aggregate for concrete and road building, and a method for recovering iron from some old heaps, and the like.

As regards utilization of colliery waste heaps, a method has been devised for using waste rock for backfilling without first hauling it to the surface, and another for more extensive utilization of carbon shales in the production of bricks.

A separate Geomorphology and Hydrology Group were called upon to prepare a 1 : 50 000 geomorphological and hydrological map of the GOP and to evaluate the geographical environment. In addition to providing a characteristic of water and relief in GOP as the two elements in the geographical environment, the maps have proved of general scientific interest as being prepared by new methods and extremely rich in content.

GOP water supply problem

The Commission on Water Management and Prevention of Water Pollution is concerned with the extremely vital issues of industrial and household water supply, and with disposal of waste waters.

Attention has been focussed on rational and thrifty utilization of existing water resources and on quantitative and qualitative aspects of water pollution in GOP. Work on a regional water balance and principles of surface-water pollution control helped to draft synthesized guiding lines and ways for improving water supply in GOP, published in a 1959 special issue of the *Bulletin*.

Intensification of Silesian agriculture

The Commission on Agriculture devoted itself primarily to: 1) utilization of exhaust heat (hothouse design); 2) forcing early vegetables by night-time illumination of plants in greenhouses; 3) calculation of nutritional standards for Silesia in order to compute a food balance for GOP. The object of these studies is to help provide for Silesia's inhabitants, who live in particular unhealthy conditions, nutritive food rich in vitamins.

The Commission is also working on fowl, swine, cattle and fur animal breeding, raising fish (carp) in ponds not hitherto used, utilization in agriculture of municipal sewage and refuse, suitable manuring of meadows and pastures, planting fruit and other trees, vegetable gardening, and so forth. Agriculture has in Silesia always been a step-child. This seems wrong. Agriculture has in an industrial region a peculiar character and deserves scientific research. Hence, there should be a special agricultural centre to investigate this peculiar character of agriculture in urban industrial areas.

Mining damage

Questions of mining damage are the concern of the Commission on Mechanics of Rock Masses. In compiling the material gathered by seismic stations in Silesia, natural feeble foci of seismic shocks have been found to exist in the upper strata of the earth crust, in addition to the subsidences originated by collapsing unfilled chambers and galleries. Furthermore, the Commission has classified land from the viewpoint of safe building conditions and, by preparing a suitable map, has provided a basis for town planning in the Silesian conurbation. Finally, the Commission has undertaken to evaluate the economic and social consequences of mining damage.

The Building Commission is largely concerned with principles of safeguarding buildings, communications, water conduits and sewerage. It has gathered considerable observational and research material, and prepared guiding lines for the safeguarding of existing buildings and the construction of new.

Furthermore, the Committee operates two other working groups: the Communication and Transport Group, and the Czechowa

Industrial District Group. The latter was appointed by the end of 1958, since that District had begun to play a vital role in national economy.

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The contributions made by the Committee are manifold as a result of the particular commissions and working groups. Some issues have been explored, results being now available and awaiting implementation; others are less well explored and require further investigation, while some studies are still in the preliminary stage. The situation seems to warrant the drawing of general conclusions as to organization, which may perhaps prove useful for other committees.

The GOP Committee had clearly defined objects and co-operation with the benificiary. the GOP Regional Plan Office, determined the scope of research and how detailed it should be. Originally, the Committee consisted of 30 eminent experts on Silesian problems, and was subsequently enlarged by more than ten further members. The basic program and directions of research were prepared by the Committee's Board, which also was in charge of organization.

Actual research was conducted by commissions and working groups, which enlisted the support of various scientific centres, and specialists on different fields of science, and concentrated roughly 200 scientific workers: furthermore, close on a hundred persons were from time to time commissioned to work on some specific questions. Co-operation with a large number of scientific centres and institutions made it necessary to co-ordinate some particular research on a national scale. Co-ordination within the Committee, between commissions and groups has been the responsibility of the Board which was in charge of the research funds.

Thus has been built up a large body of scientific workers to tackle Silesia's complex problems which are socially and economically important, and which have never before been so extensively investigated and co-ordinated. Incidentally, the results are applicable also in other urban industrial areas. These facts are doubtless a major success for the Committee.

Complete confidence in those in charge of the work of particular commissions and groups has promoted absolute freedom of action within the limits of the Committee's financial resources, and contributed at the same time towards full responsibility for the work and the results published. Combined, responsibility and freedom gave excellent results and made for undivided devotion to the Committee's objectives by a large group of scientific workers. The commission and groups were not satisfied merely to respond to the demands made on them, but considerably extended the scope of, and gave greater depth to, the research. Some groups even over-stepped in their work the territorial boundaries of the GOP. This attitude not infrequently helped to bring to light new problems not

yet investigated in Poland. New research subjects entailed a need for new research methods and these, in turn, made it possible to obtain original results which have not only enriched science in Poland, but have shed some light on a number of questions not yet settled anywhere in the world.

This is another success for the Committee, since considerable evidence has been forthcoming that research to meet the needs of everyday life not only need not lead to more practicianism, but, quite the reverse, may yield new scientific results and help in extending the theoretical basis of science.

The Committee's third major success was immediate publication of results in the *Bulletin*, if only in a preliminary form; made promptly available, those results both promited further research and hastened their being put into actual practice.

Time and again, work of the Committee supposed to supply material for the GOP regional plan met with difficulties rooted in the smallness of the area concerned. Hence, there have been repeated attempts to extend it to the Rybnik Coal Basin, then to the Częstochowa Industrial District and the Zawiercie-Myszków Subarea, and even to the entire Katowice voivodship, or more broadly, to the voivodships of Opole and Cracow, which now make up the Greater Silesia-Cracow Industrial Region, the largest in Poland. This trend was not consistent, though, and was rather the outcome of the initiative of particular commissions or groups as dictated by the geographical scope of the issues investigated, and neither found a suitable beneficiary by results, nor was sanctioned by Government or Academy Board resolutions.

Continual expansion of research subjects eventually engendered certain difficulties in co-ordination; the specialists working in particular groups understood each other less and less and annual plenary meetings, devoted to general questions, became wall-nigh the only link between them. At the same time, as more and more specialists from various fields of science became engaged in the Committee's work, the forces and resources, limited in spite of everything, became more and more dispersed. If this had continued for long, it might have had negative results. Furthermore, some questions had been thoroughly explored and any further detailed research would have been merely incidental. In these cases, it was desirable that all efforts should be devoted to application of results already tried and tested. These circumstances urged looking for new forms of organization, adapted to the Committee's actual objectives.

Usually the results of some relatively brief research on certain definite questions could well be summed up in a single report. Other problems, however, called for systematic and sustained research

and neither should nor could be dealt with by the Committee which had no regular permanent scientific staff; such research it was decided to pass on to permanent research centres (for instance, research on the Goczałkowice water reservoir, was in 1959 passed on with good results to the Academy Research Centre of hydrobiology in Cracow). Some researches have become national in scope and require co-ordination on the part of the Academy. Such research is better co-ordinated by a specialized research centre suitably equipped and permanently staffed, rather than by the Committee, which is concerned with a very wide range of issues. Finally, some research, the results of which need elaboration to the point where they can be passed on to practicians, require new forms of organization enabling them to use the laboratories of other institutions for semi-technical tests, or even to make trial runs on an industrial scale.

These reasons call for an Academy centre to be set up in Silesia to conduct the work covered thus far by the Committee's basic plan.

The new Act makes the Academy responsible for drawing up national short- and long-range plans for scientific research. In May 1960, the Academy Board endorsed a draft of the first part of the five-year plan which covers questions particularly important to national economy and, when approved by the Council of Ministers, will become part of the State plan. This draft takes account of the following GOP problems: 1) scientific foundations for air pollution control in industrial regions; 2) reclamation of industrial waste lands; 3) technological and economic utilization of industrial wastes; and 4) protection of water against pollution.

These problems indicate the directions to be followed in the work of the proposed Academy Centre in Silesia conceived as a leading centre equipped with laboratories suited to these tasks. Hence, we may say even now that the Academy centre devoted to GOP problems should 1) be set up in GOP; 2) be staffed mainly by scientific workers resident in that district; 3) co-ordinate appropriate research on a national scale at least within the scope defined by the problems already mentioned, with reference initially to GOP and subsequently to Upper Silesia or Katowice province as a whole; 4) concern itself in the first instance with giving practical effect to such of the Committee's already available results as a) guiding lines; b) standards and classification; c) tried methods of research and observation; d) developing further prototypes of instruments and equipment; and e) submitting various products to semitechnical tests; 5) have at disposal an adequate number of well equipped laboratories and producing plants of various kinds to introduce research results into practice — an element which would consolidate collaboration between science and practice with benefit to both; 6) have the right to give research commissions to university schools, primarily in Silesia and already engaged in similar research on behalf of the Committee; and 7) continue in the

first stage theoretical research work on the four problems already mentioned, and carry on the work not finished by the Committee.

It follows from the plan outlined that this centre would be of a type new in Poland and most intimately linked with actual economic practice. To begin with, three laboratories are envisaged for work on: 1) control of air pollution; 2) utilization of industrial waste and reclamation of industrial waste land; and 3) GOP water management. The centre would operate an office for research coordination, initially within Silesia, and after some consolidation, on a national scale. It should have a scientific council and groups of experts. Gradually, the centre might expand. Even so, some issues, now the concern of the Committee, should be taken over at once by existing Academy or departmental research centres or academic schools; for other questions, new research centres should be set up in due time. In this way, the Committee's current work will suffer no interruption, while research particularly important and requiring continuation will receive new organizational forms adapted to current needs and requirements.